Claims

1. A method of tracking attitude of a device comprising the steps of:

   fixing a two-dimensional array of photosensors to said device;

5   attaching an optical means to said device to image features of an environment onto said photosensors;

   utilizing said two-dimensional array to acquire a first image of features within a field of view of said array;

10   storing said first image;

   utilizing said two-dimensional array to acquire a second image of features within said field of view at a time subsequent to acquiring said first image, said first and second images being images of regions that are

15   largely overlapping such that there are features common to both of said first and second images;

   correlating said first and second images to detect differences in location of said common features within said first and second images; and

20   based upon said step of correlating, forming an attitudinal signal indicative of any changes in angular orientation of said device during an interval between acquiring said first and second images.

2. The method of claim 1 further comprising a step of controlling location of a cursor on a display screen in response to said attitudinal signal.

3. The method of claim 2 wherein said step of controlling location of said cursor includes transmitting said attitudinal signal from said device to a remote receiver in a wireless manner.

4. The method of claim 1 wherein said step of fixing said two-dimensional array is a step of attaching said array to a hand-holdable member.

5. The method of claim 1 wherein said step in which said first image is acquired is a step including defining a reference frame for correlation with a sequence of sample frames for determining said changes in angular orientation.

6. The method of claim 1 further comprising nominally focusing said photoelements at infinity.

7. The method of claim 3 wherein said steps that include acquiring first and second images are steps of forming image data of a region of an environment in which said display screen resides.

8. The method of claim 7 further comprising periodically acquiring sample images and correlating each sample image to an earlier acquired image to detect differences in location of said common features within said sample images.

9. A system for tracking attitude comprising:

a housing;

a two-dimensional array of photosensors fixed
to said housing for forming images of features;

5   storage means connected to said array for
storing a reference frame of pixel values in which each
pixel value is indicative of light energy received at a
particular photosensor at a specific time;

correlation means connected to said array and
10   to said storage means for correlating an arrangement of
said pixel values of said reference frame with at least
one sample frame of pixel values formed in response to
light energy received at said array subsequent to said
specific time; and

15   computing means, responsive to detection of
correlations by said correlation means, for generating an
attitudinal signal representing pitch and yaw of pixel
values of said at least one sample frame relative to said
pixel values of said reference frame, said attitudinal
20   signal thereby representing pitch and yaw of said
housing.

10. The system of claim 9 wherein said housing is hand
holdable.

11. The system of claim 10 further comprising a video
display and a demodulator means connected to receive said
attitudinal signal for forming a cursor-control signal
for maneuvering a cursor of said video display.

12. The system of claim 11 further comprising transmis-
sion means connected for wirelessly transmitting said
cursor-control signal to said video display.

13. The system of claim 9 further comprising optical means for nominally focusing said array at infinity, said array having arcuate edges having curvatures selected to compensate for distortions induced by said optical means.

14. A method of controlling movement of a cursor of a video display comprising steps of:

      providing a hand-holdable device having a two-dimensional array of photosensors;

5   tracking movement of said device relative to a region of an environment in which said device resides, including substeps of:

      (a) periodically forming largely overlapping images of a field of view of said array;

10   (b) storing a first image as a reference image;

      (c) correlating said images such that changes in location of characteristics of said region within successive images are computationally recognized;

15   in response to said substeps (a), (b) and (c), forming a cursor-control signal that corresponds to computational recognition of said changes in location; and

      transmitting said cursor-control signal to said

20 video display.

15. The method of claim 14 wherein said substep of correlating is a step including forming an attitudinal signal representative of pitch and yaw of said hand-holdable device.

16. The method of claim 14 wherein said step of transmitting said cursor-control signal includes transmitting said signal in a wireless manner to said video display.

17. An arrangement of a sensor and optics comprising:

an array of photosensors; and

a lens system for providing a focus for imaging by said array, said lens system having a characteristic

5 of introducing curvilinear distortion of an image to said array;

said array having a shape to achieve compensation of said curvilinear distortion, including having arcuate edges to establish said compensation.

18. The arrangement of claim 17 wherein said photosensors are disposed in a plurality of columns and a plurality of rows and wherein said photosensors combine to define an optical axis for said array, adjacent

5 columns being spaced apart by an arcuate boundary, with radii of curvature of said arcuate boundaries increasing with departure from said optical axis.

19. The arrangement of claim 18 wherein adjacent rows are spaced apart by second arcuate boundaries, with radii of curvature of said second arcuate boundaries increasing with departure from said optical axis.